which are fine encircling striæ. The calice is extremely deep, occupying about one third of the total length of the corallum, cylindroid, and only slightly expanded towards its margin. Eighteen equally developed septa appear in transverse sections of the coral immediately below the bottom of the cup; and these meet in the centre of the visceral chamber, apparently without the intervention of any columella, though seemingly somewhat elevated centrally. There are no traces of either tabulæ or dissepiments, and the interseptal loculi appear to extend uninterruptedly from the base to the calice. Towards the margins of the calice the septa appear to become obsolete; but their free edges are unknown.

Locality and Formation.—Niagara Group (Upper Silurian), Indiana, U.S.A. Collected by Mr. U. P. James.

XLVI.—*On a new Genus of Carboniferous Polyzoa.* By Professor JOHN YOUNG, M.D., and Mr. JOHN YOUNG, Hunterian Museum, University of Glasgow.

[Plate XVI. B. figs. 1-6.]

AFTER a careful examination of the literature of *Ceriopora gracilis*, Phillips, sp., the only conclusion we can come to is that a polyzoon and a coral have been confused. With the coral we have not at present to do; but to make clear our position, we shall quote the generic and specific descriptions.

"CERIOPORA (pars), Goldfuss, 1826; Blainville, 1834; D'Orbigny, 1847.

"Colony fixed by the base, from which cylindrical dichotomous branches proceed, giving a dendroid aspect. Each branch is provided with several superposed layers, enveloping each other, the cells being simply round pores on the surface.

"Goldfuss, in 1826, placed under *Ceriopora* a multitude of diverse Bryozoa. In 1834 Blainville considerably restricted the characters of the genus, and only placed in it species provided with several layers of superposed cells, whether the colony is branching or bulbous. Now, in accordance with the plan we have adopted with all the Bryozoa, we think the name *Ceriopora* ought to be reserved more specially for the branching dendroid species, the globular non-dendroid species forming the genus *Reptomulticava*. Hence it will be necessary to change the names of several of the *Cerioporæ* admitted in 1847 into our 'Prodrome de Paléontologie Stratigraphique;'

for at that time we had not recognized the differences based on the presence of one or more layers of cells."—D'Orbigny, *Paléontologie Française*, v. p. 1029 (1850–52).

"Ceriopora, nobis. (*Alveolitæ* species, Lam.)

"Polypary stony, sessile or affixed, composed of several concentric layers of cells enveloping each other; cellules tubular or subprismatic, subcontiguous, parallel or divergent."—Goldfuss, *Petrefacta Germaniæ*, p. 32.

At page 244 the polyp-cells of these corals are described as round short tubes which have neither transverse nor vertical lamellæ, neither a siphon nor lateral connecting tubules. They sometimes lie parallel and immediately in contact with each other, and press on each other so as to appear obscurely prismatic; sometimes they diverge. Their apertures are equal in diameter to the tubes, and are seldom constricted or dilated. The polypary enlarges by the concentric superposition of new layers. The branches of this mass are likewise made up of several layers.

Pictet ('Traité de Paléontologie,' 1857, iv. p. 154) places *Ceriopora* under the family Tubuliporides, tribe Foraminés—among those, therefore, which have the cells pierced in the common calcareous mass, and not salient. He considers this genus one which should rather be abolished than restricted. His definition is, "they form colonies composed of equal or nearly equal cells united by their margins, and not prolonged into tubes."

"Ceriopora, Goldfuss.

"Polypidom tuberose, composed of numerous thin concentric layers; pores round, unequally placed.

"This genus was intended by Goldfuss to include several fossil forms now referred to *Alveolites*, *Chrysaora*, &c. The above definition is of the genus as now restricted."—M'Coy, *Palæozoic Fossils*, p. 194.

"*Millepora.*—Pores very minute, perpendicular to the surface; cells without lamellæ."—*Ibid.* p. 195.

Phillips places *Millepora*, along with *Fenestella*, *Glauconome*, &c., among the Polypiaria, along with *Favosites* and the other true corals.

Morris ('Catalogue of British Fossils,' edit. 1854) puts *Ceriopora*, Goldfuss, 1826, in the Bryozoa, and gives *C. gracilis* and *C. interporosa* under that generic heading, *Millepora* being among the Zoophytes.

Amid this confusion it is apparent that Pictet's suggestion

to set aside *Ceriopora* has much to commend it; for the confusion of Corals and Bryozoa commenced with Goldfuss. His definition, therefore, is not precise enough, though it is obvious that he founded the genus on a coral. M'Coy's restricted genus also belongs to the Corals; while Morris, by his transfer of the name *Ceriopora* to a Bryozoon, has left the species under consideration without a generic name to which it has a legitimate title. This question of nomenclature is one of great difficulty; as, however, the essential character of the fossil we are about to describe separates it from all other known Carboniferous forms, we would suggest *Rhabdomeson* as the generic name, the axis being central, not lateral as in Allman's *Rhabdopleura*.

Rhabdomeson gracile (nov. gen.).

Millepora gracilis, Phillips, Pal. Foss.
Ceriopora gracilis, Morris, Catalogue.

The stem is slender, cylindrical, branching, the branches coming off at right angles to the stem and never less than an inch apart, and consists of a hollow axis formed by a thin calcareous tube, and of a series of cells ranged round the axis. There are 100 cell-apertures in a linear inch; the apertures are oval, with simple outlines, the funnel-shaped depressions at the bottom of which they are placed sloping down from the crests of the dividing ridges. These ridges are tuberculated, a large tubercle, which well-preserved specimens show to be a blunt spine, being placed at the upper and lower angles of each aperture. Hence the periphery of a single cell usually presents four such tubercles, while smaller tubercles occur between each larger pair. But the aperture of the cell does not occupy the whole area of the pore-depression; a thin lamina reduces the orifice, hymen-like, to one fourth of the area of the pit; and this restricted orifice is at the upper end of the depression (Pl. XVI. B. fig. 4). The cells are conical, the inner extremity being in contact with the axis, the cell turning upwards and outwards so that the plane of its aperture is parallel to the axis. The apex of the curved cone terminates two cells and a half below its orifice. Towards their apices the cells are separated by a very thin common wall, which thickens outwards so that the orifices are separated by a partition whose thickness is one third of the diameter of the cell-cavity at its widest part. When the cells have been removed so as to expose the hollow axis, the wall of the latter is seen to be marked by minute round spots, which at first suggested the possibility of a communication existing between the cavity of the cell and that of

the axis. But careful examination has satisfied us that not merely is the cylinder imperforate, but the cones do not even abut on it; they run out alongside of it. Both axis and cells are filled sometimes with amorphous calcareous matter or with clay sediments. In the latter case the casts obtained by dissolving away the skeleton with acid (fig. 3) show a notch on the lower side of their widest part corresponding to the thin lamina already mentioned, while the mass lying beyond the notch is the mass of sediment that filled up the pit or vestibule already described. There is no trace of septa in the cell or in the axis; there are no tubules putting adjacent cells in communication; and there is no sign of avicularia or other external processes. The spines are solid; but the worn ones show something like a central pit. We have not found the free ends of any of the branches; but the equality of all the cells forbids the supposition that they are multiplied by intercalation. The central tubular axis has a thin wall, which is distinct from that of the cells in contact with it (fig. 6). In fact, the line of separation between these calcareous layers is everywhere recognizable, and is prolonged into the tubercle or spine (fig. 6, *c*). The bounding ridge and tubercle are, in fact, shared by adjacent cells, and the calcareous matter is deposited in laminæ, as shown roughly in figs. 4, 5, & 6, whereas the walls of the cells as far as the oral lamella are homogeneous. We have not ascertained what is the condition of the calcareous matter in these layers, our chief object being to show that a central pit in these, as in other similar structures, neither implies a central canal nor an articulated appendage. Each cell has, in short, its own proper wall. The cells are throughout equal or nearly so—the differences seen in fig. 2 being of very rare occurrence, though when they exist the regularity of the quincunx is impaired. But the equality is such as to forbid the idea that the cells are intercalated, an important point in the definition of *Ceriopora*.

Assuming the hydroid character of the Graptolites, *Rhabdopleura* is the only polyzoon hitherto known in which a solid axis is found; and in it the cells terminate the nodes of the axis. The form just described rather resembles a sclerobasic coral in having the axis wholly within the circlet of cells. What may be the true affinities of *Rhabdomeson*, it would be rash on our part to attempt to determine. The novelty of the type has induced us to publish it at once, reserving the generic definition till we complete our investigations into other species referred erroneously to *Ceriopora*. We should be glad if collectors who may possess forms similar to that here figured would lend us specimens for comparison—and would suggest the

propriety of a reexamination of *Websteria crisioides*, Edw. & Haime, the description having some points of resemblance to that of *Rhabdomeson*.

Distribution.—Rhabdomeson (*Ceriopora*) *gracile* is common in all the limestones and shales which yield Polyzoa throughout the west of Scotland. It ranges from the lower to the upper members of the Carboniferous Limestone. In some of the harder shales specimens occur two or three inches in length; while by washing the soft and weathered shales, numerous well preserved fragments are easily obtained. In some localities it is associated with species of *Ceriopora*, viz. *C. interporosa*, Phill., *C. rhombifera*, Phill., and *C. similis*, Phill.; while in other localities it is the only species met with. The white limestone of Trearne, near Beith, Ayrshire, has yielded numerous natural sections. The stone splits in most cases parallel with the axis of the stem, and shows the central hollow tube, bare of cells for considerable lengths. The tube in these specimens never shows more than a fine layer of minute crystals of calcite lining its interior. Those from other localities have the tube more or less filled with amorphous calcite or clay, or both. If the identification with Phillips's species is correct, this species descends to the Pilton group.

EXPLANATION OF PLATE XVI. B. figs. 1–6.

Fig. 1. *Rhabdomeson gracile* (nov. gen.). Fragment, natural size. This and the other figures, except fig. 4, were drawn with the camera lucida.

Fig. 2. Ditto, enlarged, to show character of tubercles.

Fig. 3. Ditto, polished and slightly etched with acid, to show the mesial axis, *d*, and casts of cells: *a* and *c* show casts which reach the surface in the plane of section; the notch in the lower surface of each cast shows the position of the oral lamella, the matter external to the notch being matrix, which fills up the vestibule shown in fig. 2. Opposite *b*, a fragment of a cell is seen lying on the axis; and at *e* the apices of several cells are seen surrounding the axis.

Fig. 4. Ditto. Diagram of cell, to show conical form, position of lamella, and shape of vestibule.

Fig. 5. Ditto. Transverse section, showing hollow axis and surrounding cells cut across at various points, and the angular form caused by mutual pressure.

Fig. 6. Ditto. Two tubercles, greatly enlarged to show structure, as seen by transmitted light: *a*, cell-aperture; *b*, central axis; *c*, *c'*, tubercles.